

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A mixer circuit comprising:
a differential amplifier circuit having an RF signal input port for receiving an RF signal; and
a double-balanced mixer circuit having a first LO signal input port for receiving an LO signal, a second LO signal input port for receiving an inverted LO signal equal in frequency and amplitude to the LO signal and opposite in phase to the LO signal, a first IF signal output port for outputting an IF signal obtained by mixing the RF signal with the LO signal, and a second IF signal output port for outputting an inverted IF signal equal in frequency and amplitude to the IF signal and opposite in phase to the IF signal, the double-balanced mixer circuit receiving an output signal from the differential amplifier circuit,

the differential amplifier circuit having:

a first transistor having a control portion for receiving the RF signal inputted to the RF signal input port to output an amplified RF signal in response to the RF signal;

a second transistor having a control portion for receiving ~~[[the]]~~ a virtual inverted RF signal to output an amplified inverted RF signal in response to the virtual inverted RF signal;

a capacitor provided between the control portion of the second transistor and a ground; and

a resonating means connected to ~~each of~~ the RF signal input port, the control portion of the first transistor, and the control portion of the second transistor, the resonating means including the capacitor,

the resonating means being provided to reduce a harmonic of the RF signal.

2. (Original) The mixer circuit of claim 1, wherein the resonating means is provided such that a frequency of the harmonic of the RF signal becomes a resonance frequency.

3. (Original) The mixer circuit of claim 2, wherein the resonating means is provided such that a frequency of a third harmonic of the RF signal becomes the resonance frequency.

4. (Currently Amended) The mixer circuit of claim 1, wherein the resonating means ~~further includes~~ comprises a first resistor connected between the capacitor and the control portion of the first transistor.

5. (Currently Amended) The mixer circuit of claim 3, wherein the resonating means ~~further includes~~ comprises a first inductor connected between the capacitor and the control portion of the first transistor.

6. (Currently Amended) The mixer circuit of claim 1, wherein
each of the first and second transistors is a bipolar transistor,
each of the respective control portions of the first and second transistors is a base,
the first transistor outputs the amplified RF signal from a collector thereof in response to the RF signal inputted to the base thereof, and

the second transistor outputs the amplified inverted RF signal from a collector thereof in response to the virtual inverted RF signal inputted to the base thereof.

7. (Currently Amended) The mixer circuit of claim 1, wherein
each of the first and second transistors is a field effect transistor having a gate, a source, and a drain,
each of the respective control portions of the first and second transistors is the gate thereof,

the first transistor outputs the amplified RF signal from the drain thereof in response to the RF signal inputted to the gate thereof, and

the second transistor outputs the amplified inverted RF signal from the drain thereof in response to the virtual inverted RF signal inputted to the gate thereof.

8. (Currently Amended) The mixer circuit of claim 1, wherein the differential amplifier circuit has:

a ~~first current source~~ first resistor connected to the first transistor and the second transistor;
~~a second current source connected to the second transistor~~;
a second resistor connected between the first transistor and the ~~first current source~~ first resistor; and

a third resistor connected between the second transistor and the ~~second current source~~ first resistor.

9. (Currently Amended) The mixer circuit of claim 1, wherein the differential amplifier circuit has:

a ~~first current source~~ first resistor connected to the first transistor and the second transistor;
~~a second current source connected to the second transistor~~;
a ~~[[second]]~~ first inductor connected between the first transistor and the ~~first current source~~ first resistor; and

a ~~[[third]]~~ second inductor connected between the second transistor and the ~~second current source~~ first resistor.

10. (Currently Amended) The mixer circuit of claim 9, wherein the ~~first and second current sources~~ is first resistor is a ~~[[the same]]~~ current source.

11. (Original) The mixer circuit of claim 1, wherein the RF signal has a frequency of 0.8 GHz or more.

12. (Currently Amended) A differential amplifier circuit comprising:
an RF signal input port for receiving an RF signal;
a first transistor having a control portion for receiving the RF signal inputted to the RF signal input port to output an amplified RF signal in response to the RF signal;
a second transistor having a control portion for receiving ~~[[an]]~~ a virtual inverted RF signal opposite in phase to the RF signal to output an amplified inverted RF signal in response to the virtual inverted RF signal;
a capacitor provided between the control portion of the second transistor and a ground; and
resonating means connected to each of the RF signal input port, the control portion of the first transistor, and the control portion of the second transistor, the resonating means including the capacitor,
the resonating means being provided to reduce a harmonic of the RF signal.

13. (Original) The differential amplifier circuit of claim 12, wherein the resonating means is provided such that a frequency of the harmonic of the RF signal becomes a resonance frequency.

14. (Original) The differential amplifier circuit of claim 13, wherein the resonating means is provided such that a frequency of a third harmonic of the RF signal becomes the resonance frequency.

15. (Currently Amended) The differential amplifier circuit of claim 13, wherein the resonating means ~~further includes~~ comprises a first resistor connected between the capacitor and the control portion of the first transistor.

16. (Currently Amended) The differential amplifier circuit of claim 13, wherein the resonating means ~~further includes~~ comprises a first inductor connected between the capacitor and the control portion of the first transistor.

17. (Currently Amended) The differential amplifier circuit of claim 13, wherein each of the first and second transistors is a bipolar transistor,
each of the respective control portions of the first and second transistors is a base,
the first transistor outputs the amplified RF signal from a collector thereof in response to the RF signal inputted to the base thereof, and
the second transistor outputs the amplified inverted RF signal from a collector thereof in response to the virtual inverted RF signal inputted to the base thereof.

18. (Currently Amended) The differential amplifier circuit of claim 13, wherein each of the first and second transistors is a field effect transistor having a gate, a source, and a drain,

each of the respective control portions of the first and second transistors is the gate thereof, the first transistor outputs the amplified RF signal from the drain thereof in response to the RF signal inputted to the gate thereof, and

the second transistor outputs the amplified inverted RF signal from the drain thereof in response to the virtual inverted RF signal inputted to the gate thereof.

19. (Currently Amended) The differential amplifier circuit of claim 13, wherein the differential amplifier circuit has:

a ~~first current source~~ first resistor connected to the first transistor and the second transistor;
a ~~second current source connected to the second transistor~~;
a second resistor connected between the first transistor and the ~~first current source~~ first resistor; and
a third resistor connected between the second transistor and the ~~second current source~~ first resistor.

20. (Currently Amended) The differential amplifier circuit of claim 13, wherein the differential amplifier circuit has:

a ~~first current source~~ first resistor connected to the first transistor and the second transistor;
a ~~second current source connected to the second transistor~~;
a ~~[[second]]~~ first inductor connected between the first transistor and the ~~first current source~~ first resistor; and
a ~~[[third]]~~ second inductor connected between the second transistor and the ~~second current source~~ first resistor.

21. (Currently Amended) The differential amplifier circuit of claim 20, wherein the ~~first and second current sources~~ is first resistor is a ~~is~~ [[the same]] current source.

22. (Original) The differential amplifier circuit of claim 13, wherein the RF signal has a frequency of 0.8 GHz or more.